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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/663,663

09/17/2003

Masaki Shima

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3797

7590

10/05/2005

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EXAMINER

SOHN, SEUNG C

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,663

Applicant(s)

SHIMA ET AL.

Examiner

Seung C. Sohn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 903, 304.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. **Claims 1 and 9** are objected to because of the following informalities:

On claims 1 and 9, line 3, "type first" should be changed to -- type --.

On claims 1 and 9, line 6, "type second" should be changed to -- type --.

On claim 1, line 19, "layer, and" should be changed to -- layer and the third non-single-crystalline semiconductor layer, and --.

On claim 1, line 20, "in said either" should be changed to -- in either said first non-single-crystalline semiconductor layer or said second non-single-crystalline -- for clarity.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. ***Claims 1-6, 8-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshimi et al. (Patent No. US 6,200,825).***

Regarding claim 1, Yoshimi et al. shows in Fig. 1 a photoelectric conversion device comprising: a substrate (1) having a main surface; a first conductivity type first

non-single-crystalline semiconductor layer (111) formed on said main surface of said substrate; a second conductivity type second non-single-crystalline semiconductor layer (113) formed on said main surface of said substrate; and a substantially intrinsic third non-single-crystalline semiconductor layer (112) formed between said first non-single-crystalline semiconductor layer and said second non-single-crystalline semiconductor layer, wherein many of crystal grains contained in said third non-single-crystalline semiconductor layer have major axes substantially perpendicular to said main surface of said substrate on an interfacial portion between at least either said first non-single-crystalline semiconductor layer or said second non-single-crystalline semiconductor layer, and many of crystal grains contained in said either semiconductor layer have major axes substantially parallel to said main surface of said substrate on said interfacial portion (Col. 5, lines 4-56).

Regarding claims 2 and 12, Yoshimi et al. shows in Fig. 1 that the average grain size of said crystal grains contained in said either semiconductor layer in the direction parallel to said main surface of said substrate is larger than the average grain size of said crystal grains contained in said third non-single-crystalline semiconductor layer (112) in the direction parallel to said main surface of said substrate.

Regarding claims 3 and 13, Yoshimi et al. shows in Fig. 1 that said first non-single-crystalline semiconductor layer, said second non-single-crystalline semiconductor layer and said third non-single-crystalline semiconductor layer consist of microcrystalline semiconductor layers (Col. 5, lines 26-32).

Regarding claims 4 and 14, Yoshimi et al. shows in Fig. 1 that said first non-single-crystalline semiconductor layer, said second non-single-crystalline semiconductor layer and said third non-single-crystalline semiconductor layer consist of microcrystalline silicon layers (Col. 5, lines 26-32).

Regarding claims 5 and 15, Yoshimi et al. shows in Fig. 1 an electrode layer (2) formed between said substrate and either said first non-single-crystalline semiconductor layer or said second non-single-crystalline semiconductor layer to come into contact with either said first non-single-crystalline semiconductor layer or said second non-single-crystalline semiconductor layer, wherein many of crystal grains contained in said electrode layer have major axes substantially perpendicular to said main surface of said substrate.

Regarding claims 6 and 16, Yoshimi et al. shows in Fig. 1 said electrode layer is a transparent electrode layer.

Regarding claims 8 and 18, Yoshimi et al. shows in Fig. 1 at least one power generation unit (11) having said first non-single-crystalline semiconductor layer, said second non-single-crystalline semiconductor layer and said third non-single-crystalline semiconductor layer.

Regarding claim 9, Yoshimi et al. shows in Fig. 1 a substrate having a main surface (1); a first conductivity type first non-single-crystalline semiconductor layer (111) formed on said main surface of said substrate; a second conductivity type second non-single-crystalline semiconductor layer (113) formed on said main surface of said substrate; and a substantially intrinsic third non-single-crystalline semiconductor layer

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(112) formed between said first non-single-crystalline semiconductor layer and said second non-single-crystalline semiconductor layer on said main surface of said substrate, wherein at least either said first non-single-crystalline semiconductor layer or said second non-single-crystalline semiconductor layer includes a structure formed by stacking a first layer and a second layer containing many crystal grains having major axis directions substantially different from each other, many of crystal grains contained in said first layer have major axes substantially parallel to said main surface of said substrate, and many of crystal grains contained in said second layer have major axes substantially perpendicular to said main surface of said substrate (Col. 5, lines 4-56).

Regarding claim 10, Yoshimi et al. shows in Fig. 1 said first layer is in contact with said third non-single-crystalline semiconductor layer, and many of crystal grains contained in said third non-single-crystalline semiconductor layer have major axes substantially perpendicular to said main surface of said substrate.

Regarding claim 11, Yoshimi et al. shows in Fig. 1 said second layer (113) is in contact with said third non-single-crystalline semiconductor layer (112).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimi et al. (Patent No. US 6,200,825) or Muramatsu et al. (Patent App. Pub. No. US 2002/0005519 A1) in view of Applicant's Admitted Prior Art (AAPA).

Regarding claims 7 and 17, Yoshimi et al. or Muramatsu et al. shows the claimed invention as above, but is silent that the transparent electrode layer consists of AZO. AAPA discloses that said transparent electrode layer consists of AZO (Page 2, line 12). It would have been obvious to one of ordinary skill in the art to provide the AZO electrode layer of AAPA in the device of Yoshimi et al. or Muramatsu et al. for the purpose of providing better transparent electrode.

Conclusion

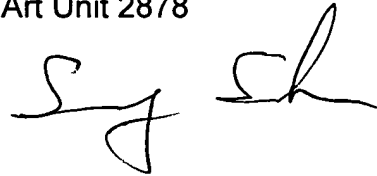
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seung C. Sohn whose telephone number is (571) 272-2446. The examiner can normally be reached on Monday through Friday from 8:30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seung C. Sohn
Examiner
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A handwritten signature in black ink, appearing to read 'Sg Sh', located below the printed name and title.